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GENESIS OF AIR MOBILITY:
THE "HUMP" AND THE BERLIN AIRLIFT

by

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EXECUTIVE SUMMARY

TIFFLE: Genesis of Air Mobility: The Hump and the Berlin Airlift

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Strategic air mobility was born over the Himalayan mountain ranges of the China-Burma-India 'Hump" airlift. Lessons learned during this airlift were applied three years later during the humanitarian Berlin Airlift of 1948 to 1949. Procedures, techniques and official Air Force doctrine on air mobility was first written during these operations and provided the standards of modern force enhancement thought as found in the current Air Force Manual 1-1. Air mobility is a vital Air Force mission and its doctrine must be proven and sound. As the military enters more and more operations other than war**,** the aerial vehicle of choice will, more than likely, be an air mobility asset. Doctrine must be dynamic enough for the Air Force to do this job right the first time and every time.

BIOGRAPHICAL SKETCH

Lieutenant Colonel Dale F. Bible (M.S., Embry-Riddle University) is a Command Pilot with over 4,000 hours of air mobility operations. His professional career has taken him to over 40 countries supporting JCS, national and coalition taskings. He has served in Okinawa, Japan, as a Squadron Commander in 1992-94, is a fully qualified Joint Specialty Officer, and has flown the T-38, KC-135, and RC-135 aircraft. He is a graduate of Armed Forces Staff College and Squadron Officer School. Colonel Bible has been selected for promotion to Colonel and is a student of the Air War College, class of 1995.

Chapter I

INTRODUCI'ION

Webster defines doctrine as “a principle or body of principles presented by a specific field, system, or organization for acceptance or belief.” To quote Lt. Col. Charles Miller, USAF in his seminal, Airlift Doctrine...“The primary and overriding role of military air transportation is to support the air forces. As such, it belongs to the air forces and will be controlled by them...military air transportation is also important as a logistics tool for the entire...force.” (10:19)

Strategic and tactical airlift are vital. and essential to the Air Force vision of Global Reach ... Global Power. As United States Armed Forces withdraw more and more into garrison forces, the role of air mobility takes on an even greater importance in U.S. power projection.

United States military forces must be able to get to the fight in a timely nature and the supply chain that supports that fight must continue uninterrupted. As General William Tunner, former commander of both the Hump and Berlin airlifts stated.... “The real excitement of running an airlift is seeing tonnage delivered increase, in seeing aircraft utilization rates go up and most important of all, seeing aircraft accident rates go down.” (3:109)

This paper will consider the role of airlift., its strengths, weaknesses, and limitations as seen during the China-Burma-India operation (the Hump) and the Berlin Airlift. In particular, I will analyze airlift doctrine in theater,, what changes were necessary, and finally what lessons were learned in flying the Hump and Berlin airlift operations, which proved timeless for today’s senior air mobility planner. The vehicle for this analysis will be to look at the weather and terrain, the aircraft available, the men who flew these operations and their leaders, and lastly, the lessons learned.

CHAPTER II

AERIAL SUPPLY OVER THE HUMP AND INTO BERLIN

The route of flight “over the Hump” is the flight path over the Himalayan mountain range traversing India, Northern Burma and China. (See Figure 1.) This series of airlift sorties started in 1942 and continued through the end of World War II. In fact, selected Hump sorties continued even after the war ended for the reparation of allied POWs and supplies to the still beleaguered Nationalist Chinese forces. The importance of these sorties stemmed from the Japanese Army's conquest of the Burma road and the port of Rangoon, thus severing the only ground channel of supply to the China area of operations. All supplies to General Chennault's 14th Air Forces and the allied National Chinese fighters thus had to be transported by air. (15:59)

The airlift over the Hump began most inauspiciously. In July of 1942, Hump aircraft delivered only 85 tons of supply when it should have been 2,700 tons based on the number of a available air crews and airplanes. This was the first sign of problems in airlift operation doctrine, and can be attributed to lack of singleness of purpose. (10:51) Different theater commanders drew off personnel, material, and aircraft in an uncoordinated manner. The airlift commander had his air force taken from him piece by piece. He couldn't keep all his assets together as should be required in a strategic system such as air transportation, Until the supra-theater commander could personally control all forces in his entire geographic area of responsibility, it was impossible for him to accomplish his tasking.

Whereas the Hump sorties supported war fighters, the airlift in Berlin supported a defeated civilian population whose ground transportation support had been denied by the occupying Soviet Union's military forces. The Western world sent a powerful sign to the Communist East that it would not permit a full city to be bullied into submission or starvation.

This airlift, which began on 28 June 1948 and lasted until 1 August 1949, had as its principle supporter the President of the United States. (4:93)

The Berlin Airlift was also the newly independent Air Force's first chance to participate in a large scale humanitarian effort. The Russians had closed off the occupied city of Berlin to all road, rail, and barge traffic but were totally dependent on air power. The target of the Berlin Airlift was never that of a certain number but rather each day was an attempt to achieve maximum tonnage. (10:178) One will see that strategic airlift was born in the China-Burma-India theater, and it learned to walk just a short three year's later through the corridors of the Berlin Airlift. (See Figure 2.)

The Geography and the Weather: Few areas of the world brew worse weather for airlift operations than those of the Himalayan mountain range or the clouded plains of central Europe. Direct operations over the Hump would necessitate crossing peaks in excess of 28,000 feet, thus, the route employed was a more southerly 525 mile stretch from extreme eastern India into western China. The normal altitude flown was 16,000 feet and above during visual flight conditions and a minimum enroute altitude of 20,000 feet during instrument flying conditions. Instrument flight conditions prevailed for the most part over the Hump and air crews faced some of the worst weather known on the face of the Earth. The Hump is where the torrential monsoon rains of the Bay of Bengal in India meet the extremely cold and dry air of the upper China plateau, causing year-round icing conditions and in-flight winds exceeding 100 miles per hour. (5:82) It was not at all unusual for air crews to depart India with ambient temperatures of over 130 degrees Fahrenheit, climb to 20,000 feet where the temperatures would be 40 degrees below zero, and then land in China where the temperatures, depending on the season, could range from 100 degrees to below freezing.(1:226) A problem encountered by airlift crews for the first time in

China and India was that associated with high altitude, unpressurized flight. On many occasions aircraft came in on perfectly clear days at their destination and simply flew straight into the ground. These crashes, controlled flight into terrain, killed many excellent aviators and it wasn't until flight surgeons started flying regularly with the Hump crew that a cause, and more importantly,, a cure,, was found for these problems. (10:127) Air crew members were simply hypoxic and the addition. of oxygen masks and the discipline of using them eliminated this problem.

The actual flight conditions of the Hump were some of the worst documented in aviation history. The entire route was frequently covered in thunderstorms, and the thunderstorm season lasted six months. Also, icing conditions were often encountered from soon after takeoff to just before landing. Even though the route of flight measured only 525 miles and rarely exceeded 160 minutes, it was considered more dangerous to fly the Hump in a cargo aircraft than to take a bomber into the central European theater and bomb Germany; the loss rates were that high. (13:137)

Not only was the weather in-flight extremely hazardous, but conditions on the ground under the Hump could be equally dangerous. If air crew members were forced down or had to bailout over Burma due to either enemy action or mechanical problems, they could expect to land in trackless jungles inhabited by known headhunters. In India, they would scarcely fare better as extremely warlike tribes existed in that area. Further, in China, not all members of the Chinese nation were friendly to allied fliers. Reparation from the communists averaged an exorbitant $100,000 per aviator.

Because of these concerns, aircraft were reserved strictly for the search and rescue role in Hump operations in both China and India. Also, crew members were trained in survival techniques and morale and competence improved.

Some other problems associated with this theater were dysentery and malaria. At the end of 12 months, you could expect to lose 60 percent effectiveness due to air crew members' illnesses. At the end of 18 months in theater, this dropped a further 30 percent. That is, in a 18 month period from the time you arrived in India, you would have lost 90 percent of your combat air crews.(16:18)

For this reason, a policy was instituted that air crew members would be rotated out of theater as soon as they had 12 months on station and 750 hours flying time in theater.(15:90) Altitudes, routing,, and terrain were completely different into Berlin. For the first limitation, there were only three corridors .of 20 mile width which existed from West Germany through East Germany and into the Four-Power occupied city of Berlin. - These corridors had altitude limits of 1,000 feet to 10,000 feet, so for that reason., pilots operated right in the middle of whatever weather there was. The Berlin Airlift was not afforded the luxury of a gradual build-up like the Hump operations. Regardless of weather, crews had to deploy since Berliners depended on their cargo of coal and fuel for daily survival. It all had to happen together and at once. (15:176)

The air space limitations into Berlin were complicated not only by weather, but by time, and air base restrictions as well. In central Europe weather was so changeable as to be almost impossible to forecast. To get past the visual to instrument flight conditions problem, all sorties, regardless of weather conditions, were required to fly using instrument flight regulations. (3:119) By adapting the procedures, airlift operations could have aircraft arriving and departing the Berlin airports every 90 seconds.

To assist in weather forecasting into Berlin, procedures were developed for B-17s to fly as weather ships back and forth through the corridors giving a continual and almost constant picture of meteorological conditions. (4:159) Since in central Europe, only a degree or two of temperature change or a few knots change in wind speed or direction can determine safe flying weather, hard minimums were established for landing criteria. If the pilot did not have one mile visibility at 400 feet attitude and a visible runway, he was to abort his landing. (4:158) To assist in getting the aircraft safely on the ground, Ground Control Approach radar was used for all landings. (9:61) Another radar addition which helped air crews in Berlin was the CPS-5 Air Traffic Control Radar at Tempelhoff Airport. With its 80 mile distant range capability and ability to distinguish planes from one another quickly, it was used to provide safe separation of aircraft into the Berlin Airports. In fact, after its debut, no other mid-air collisions between airlift aircraft occurred. (8:81)

As previously mentioned, the corridors into Berlin from the west were only 20 miles wide, therefore, aircraft separation depended to a very large degree on timing and altitude separation. Often United States Air Force crews would emerge from an envelope of bad weather to find another aircraft disconcertingly close. Interestingly, the British never encountered this problem and the reason most often given is that the Royal Air Force always flew with a navigator on board. The American Air Force put only three people on board and had a higher accident rate than the RAF which flew with four people per transport. (10:180)

As opposed to the China-Burma-India Theater where 13 air bases in India fed 6 air bases in China, there were originally only two bases to land at in Berlin. (4:122) This obviously limited operations. The French sector of Berlin was selected for a third airport and thus Tegal Airfield

was built from the rubble up and the stress on the original two airports in Berlin was lifted. (15:211)

To take advantage of the shorter flying times between air bases in West Germany, procedures were established for a two corridor-in and one corridor-out procedure utilizing timing and speed. The North and South corridors were for entering Berlin only and the central corridor was exclusively for exiting. To assist in the orderly flow of air traffic, each pilot was allowed only one landing attempt. Every missed approach resulted in a return flight home in an aircraft full of supplies needed by the desperate city of Berlin. (4:123)

Using this "city pair" combination of two entrances and one exit, aircraft flying the same speeds and ground paths resulted in three minute spacing and two aircraft doing the work of three. (15:170) The Allies also moved aircraft around in West Germany placing aircraft with the greatest load capacity closest to Berlin, thus, U.S. aircraft were found at British bases and vice versa. Procedures were also established so that a two and one-half ton loaded C-47 would have to wait for a ten ton loaded C-54 to take off. Also departing, loaded aircraft had priority over empty returning aircraft.

The Machines: Because the weather, terrain, and operational limitations were tough, careful selection of machines was required. The first aircraft used to ferry supplies across the Hump was the C-47 Gooneybird, a military version of the supremely successful commercial Douglas DC-3. Although air crew members were extremely proud and satisfied with this aircraft, the fact remained that it was only a two engine aircraft with a two and a half ton payload, severely restricting supplies needed to go over the Hump. (15:70) To rectify this shortfall, the C-46 Commando was pressed into service.

Resembling an overgrown C-47, the Commando entered service with an inadequate testing program. Consequently, a significant number of the aircraft's bugs were worked out operationally. This caused a dramatic number of noncombat losses and made for an initial lack of acceptance of the aircraft by air crew members. (6:141) The C-46 proved itself well, however, and even though it was a two engine aircraft, it increased payload capability to four tons per aircraft load. (15:70) But the men who ran aircraft movement over the Hump knew that it was a four engine mountain range and that is what would be required.

Douglas Aircraft consequently pressed ahead with the C-54, the military version of the DC-4. This four engine cargo aircraft proved extremely successful. Not only did it increase payload by over 150 percent, but it also gave air crew members a four engine safety factor when flying the Hump. Aircraft engines were extremely reliable and the aircraft was equipped for the first time with a long range radio navigation system (LORAN). LORAN is an extremely accurate, all-weather navigation system which allowed for precise navigation across the Himalayan mountain range. There would be no more losses to the mountains because of lost, wind-blown aircraft. The C-54 was also the first aircraft equipped with an instrument landing system (ILS), which greatly improved all-weather air cargo capability allowing for assured landings at destinations in even the foulest of weather conditions. (7:181)

Another aircraft used across the Hump was the famous B-24 Liberator, modified for cargo operations and designated as the C-87. It was a superb aircraft in that., for the first time, a cargo airplane had a supercharger system on the engines allowing it to fly in excess of 30,000 feet: now, air crew members could get above most of the weather. (7:180) The tanker version of the B-24, known as the C-109, was never as successful as the C-87. Engineers believed this was because the aircraft always took off and landed at its maximum gross weight. That is, it took off

overloaded, placing extreme stress on the landing gear and the engines. This enabled it to land at its maximum gross weight so as to off load the greatest amount of fuel in the Chinese theater. The C-109 proved extremely unpopular with air crew members for it was almost sure death if hit by enemy aircraft.

The most important operation over the Hump was the aerial movement of aviation fuel. Because of the high cost paid in men and machinery, the average cost of a gallon of gasoline flown over the Hump was estimated at $1,000 a gallon in 1945 dollars...obviously a very high price to pay for the continuance of the war in Asia.

Two reasons explain why this price was deemed acceptable. First, it was believed the initial attack on mainland Japan would come from air bases in China. Although this did not transpire, over 2 million Japanese troops were maintained to fight 14th Air Force and the Nationalists on mainland China. That is .2 million Japanese forces that did not face American troops elsewhere in the Pacific. (15:58)

Second, the importance of aviation fuel in this theater cannot be overemphasized; in fact, the only time 14th Air Force ever stopped combat operations against the Japanese is when they ran out of fuel. There was never a war-stopping shortage of bombs, ammunition, air frames, or trained air crews. (10:151) The only time the war ever stopped was due to a lack of aviation fuel. Hump airlift proved you could airlift anything, anywhere, (15:158)

The Berlin Airlift was more concerned with coal and food than with bullets and bombs. The Berlin Airlift, code name “Operation Vittles,” was the fledgling United States Air Force's first sustained humanitarian air mobility mission. In 1948, the merging of Air Transport Command and Naval Air Transport Service into the Military Air Transport Service combined competing service activities and provided a force mix of aircraft useful for the airlift mission.

(15:156) The Berlin Airlift also made a powerful political statement: The United States and the Western world would not be dictated to regarding where it could or could not go.

When the Berlin Airlift started, United States Air Forces in Europe contributed its few C-47s, woefully inadequate for the job. Before this operation was complete, however, the Air Force had contributed 421 aircraft. The Air Force used 309 C-54s, 105 C-47s, 5 C-82s, 1 C-97, and 1 C-124 aircraft. (17.81)

The Berlin Airlift which began on 28 June 1948 was an all C-47 affair, however, due to limitations previously discussed, all C-47s had been removed from airlift operations by the end of September 1948. (11:99) The C-54 of Hump fame was the workhorse of this airlift as well, but it heralded a change in military transport aircraft. The C-82 was a new airlift aircraft used extensively for large and unwieldy equipment. This two-engine aircraft was the forerunner of the C-119 Boxcar and similar in design. Because this twin boom transport flew in the construction equipment used in laying the runway for Tegal Airport, this aircraft was instrumental in the building of that airport. The C-97 and C-124 aircraft could have been valuable in the Berlin 'Airlift., but since only one of each type was allocated to this effort, their contribution was negligible.

An aircraft that made a tremendous difference in the Berlin Airlift inter-theater vice intra-theater was the C-74 Globemaster. This monster transport was designed from the ground up as a military cargo plane. Although there was only one squadron of these in the Air Force in 1948, this aircraft made a great contribution to the Berlin Airlift. This four engine plane had the previously unheard of capability of carrying 25 tons of cargo. (15:197) It was used extensively to ferry C-54 engines between the United States and England allowing for a high utilization rate for the C-54. The C-74 provided the logistics tail for the C-54. The one time the C-74 flew the

Berlin Airlift route, it made six trips that day vice the four standard of a C-54, and it carried 25 tons of cargo per sortie vice the ten tons of the C-54. (3:17) The Berlin Airlift proved again Air Mobility assets are best utilized in a high load per sortie ratio. Enough large aircraft are more important than many small transports. (8:145)

The Men and their Leaders: Although he held the job for only ten months, the first commanding officer of the Hump operation was Colonel Edward Alexander. This officer worked night and day in setting up this ferrying command, but because he delegated no authority or responsibility to his staff, at the end of ten months, Col. Alexander was a broken man.
The next commander of the Hump operation was Brigadier General Earl Hough, whose deputy was Colonel Thomas Hardin. Hough and Hardin coordinated a tremendous drive. They greatly exceeded the minimum number of tonnage required over the Hump, but only at great cost. Col. Hardin had a saying, "There is no weather on the Hump," which meant that he forced crews to fly their route of flight no matter what they encountered, (9:40) Consequently they lost a great number of aircraft. For example, between June and December of 1943, there were 155 major aircraft accidents. Crew fatalities alone exceeded 170 casualties, causing a significant hue and cry from wives and survivors in the states and from the men in theater. Gen. Hough was replaced by Major General William Tunner in August, 1944. (15:63)

The arrival of Gen. Tunner marked the first air leader with a developed expertise in ferrying and cargo operations. (15:60) Gen. Tunner established a number of standards that greatly improved the Hump operation. One of the first instituted was in the care and feeding of his troops. When Gen. Tunner arrived, there were no theater post exchanges, movies, or fresh food facilities. Neither were there delineated theater rotation policies, standardized air tasking orders, training plans, or maintenance functions. To combat preventable problems, he took a

number of B-25s, removed all their armament and retrofitted aerial spraying apparatus. With these 'bug bombers", he sprayed the entire living area of the Hump pilots and air crew members with insecticide and eliminated the mosquito problem and, consequently, malaria. He demanded PX facilities and recreational facilities. He took advantage of the smart people he had working for him, used his staff well, and morale greatly improved.

In terms of crew member safety, two of Gen. Tunner's innovations stand out. He introduced production line maintenance, or PLM. With PLM, the aircraft had a standardized maintenance schedule. (10:55) This maintenance schedule included a certain number of hours the aircraft would be flown then stood down. An individual maintenance team would then comb the aircraft from tip to tail. His maintenance officers trained individuals with specific responsibility for each separate subsystem such as the engines, instruments, flight controls, and environmental systems.

The significance of production line maintenance cannot be overstated. After its institution, inspection down time was reduced by 25 percent and aircraft mission capable rate exceeded 85 percent. Standardization of maintenance procedures per aircraft type greatly increased the efficiency of Hump operations. (10:55) For the first time, a standardized maintenance system existed based on specific aircraft type theater-wide.

Finally, Gen. Tunner set up a theater orientation program for newly assigned air crew members. Regardless of aviation expertise, each pilot spent at least six weeks and a certain number of hours as a copilot before upgrade to first pilot or aircraft commander. This ensured all pilots were sufficiently competent in their type of aircraft and on the route of flight.

There was nothing Gen. Tunner could do about the Japanese fighter danger facing his air crew members flying unarmed cargo aircraft across the Hump. He did, however, coordinate with

General Chennault that airborne fighter escorts would be attempted at least on the Chinese side of the China-Burma-India theater.

The men who ran the Berlin Airlift faced different but equally daunting problems. The first commander of the Berlin Airlift was Lt.Gen. Curtis LeMay, commander of United States Air Forces in Europe (USAFE). Although he was a highly decorated combat pilot, his expertise in airlift was nil. He was soon replaced by Brigadier General Joseph Smith who was soon replaced by Gen. Tunner of Hump fame. Now the airlift was being run by an "air lifter" and the results of this were soon evident. Under USAFE, the airlift provided Berlin with 700 tons of goods daily when it required 5,000 tons. (17:76)

When Tunner arrived in Germany he found he had inherited a "cowboy" organization. Pilots went to whatever aircraft was pre-flighted and loaded with cargo. They then flew their own routes through the corridor and returned just as casually. Tunner found uncoordinated logistics in all respects, including no extant crew scheduling. (4:121)

Tunner re-introduced ideas he had used in the Hump operation. All aircraft flew the same ground track, the same airspeeds, used instrument flight procedures, and landed using GCA instrument approaches. He instructed air crews to stay with their aircraft in Berlin, and he brought operations and maintenance briefers to the crews. He also brought hot food to the aircraft as well. Using these procedures, ground time at Berlin was now reduced to between 20 to 30 minutes. (15:172)

As in China, Tunner worked on morale. He introduced an airlift newspaper, The Task Force Times, and created unit competition by publishing comparative statistics on sorties flown and tonnage delivered. He had quarters reserved exclusively for his people, and tried to set up a fair rotation policy wherein no one remained in theater beyond 180 days. He was aided in this by

the Air Force's establishment of a Berlin training squadron at Great Falls AFB, Montana. Here, air crews trained on Berlin procedures in the aircraft so that they were ready to go upon arrival in country. (17:80) General Tunner demanded standardized flying, but supported improvisation in procedures. (2:1.25) Once again, as during the Hump operation, Tunner spent a lot of time with maintenance issues. The Berlin sorties were hard on aircraft due to their short duration and extremely heavy landings. This was exacerbated by a great deal of time spent with engines idling on the ground. (3:131), Cargo was corrosive to aircraft parts: 60 percent of airlift tonnage was coal and the dust got into every part of the aircraft. (17:76) The procedures set up for maintenance were similar to Gen. Tunner's PLM procedures in India.

Tunner insisted on 50 hour aircraft checks at home station. At the 250 hour mark, the aircraft were flown to RAF Burtonwood, England, where a 24 hour a day operation turned the aircraft around as soon as possible. At the 1,000 mark of flight time, the aircraft were ferried back to America for a complete overhaul. (4:129) In this manner aircraft were kept as mission ready as technology allowed.

Gen. Tunner's goal in Berlin, as in India, was that maximum tonnage per sorties and maximum sorties per aircraft were achieved using extremely standardized air and ground crew procedures. All personnel at each base and in each cockpit always performed their tasks the same.

Another aspect of Hump operations Tunner brought to Berlin was the 19 use of local civilians. In Asia, he used unskilled Indian and Chinese civilians for dull jobs such as washing aircraft and guarding supply depots. In Germany, he employed highly skilled local workers to help. In this manner he used German aircraft mechanics to work on U.S. aircraft. (15:183) Local German workers also constructed and repaired airports, and loaded and unloaded aircraft. The

use of German mechanics was especially successful as they freed up American servicemen for other duties.

These efforts were effective and measurable. For example, on Easter Sunday 1949, the aircraft of the Berlin airlift transported 13,000 tons of coal to the city. (4:182) For the entire month of March of that same year, more tonnage was delivered by air alone to Berlin than had been delivered by combined truck, rail and barge movements to the city during the month preceding the blockade. (4:182) Again in Berlin as in Asia, the end of the blockade did not signal the end of the airlift. For political considerations (i.e., show of will to the Soviets), Tunner continued to re-supply and replenish Berlin until the end of summer, 1949. (17:81) The airlift was so effective that Berlin industries were exporting goods on airlift aircraft. For every 260 tons of cargo flown into the city, 100 tons of manufactured goods came out. (17:76) Again, airlift proved it could move anything, anywhere.

CHAPTER THREE

LESSONS LEARNED

What lessons can be learned from the Hump and Berlin experiences? First and foremost, one must consider the task. The goal of the Air Transport Command during the India-China campaign was to deliver 2,500 tons during the month of February of 1942 and to double that tonnage shortly thereafter.(16:17) The crews of the Hump accomplished that; however, they suffered severely from aircraft accidents and disease until Gen. Tunner arrived and tackled these problems. Through the Hump airlift, Chinese armies were able to maintain their resistance which in turn forced the Japanese to employ 2 million men in arms on the Chinese mainland. That's 2 million fewer Japanese soldiers to shoot at American soldiers in other portions of theater. (15:58)

Operations over the Hump revealed the importance of standardized .operations. Tunner had crews all following the same procedures in flying aircraft, and maintenance was formalized under PLM so that aircraft availability improved. Communications and supply were made under discipline to a schedule. Troops knew what was expected of them and they were trained to that standard. (15:132)

Perhaps the most important lesson learned was that, in 1942, there was no Army Air Corps expertise in air transport and no all-encompassing doctrine for the correct use of air power in this manner. The China-Burma-India aircraft often did something other than aid in the supply of China. (10:54) There was no unity of control and command of airlift forces in theater. Each combat commander thought he could take an aircraft and crew at his discretion and use them elsewhere in his theater. It was miraculous anything got over the Hump! This situation was rectified during the Hump, and Gen. Tunner went on to prove what he learned from the Hump experience during the Berlin Airlift and other areas of humanitarian support. More on this later.

Air Force doctrine states the control of air forces must belong to an airman. As a corollary of that, air transportation must belong to an air transporter,, or to use the modern term, air mobility expert. In a personal feud with Gen. Chennault, Gen. Tunner fought for and won full control of the airlift operation by Air Transport Control under direct supervision of General Arnold, commanding officer of Army Air Forces, not the theater commander, Regarding air transportation, General H.H. Arnold, arguably the greatest thinker of Air Power in America's history stated, "...the Commanding General, Army Air Forces, not the theater commander., is the controlling agent of air transportation." (10:37) Clearly illustrated is the concept of air transportation as a national asset, not a theater asset. just as Gen. Chennault would not have wanted his P-40s and B-25s placed under control of the Army commander, so- today's Air Transport commander, whose theater is inter-theater as opposed to intra-theater, does not want his assets placed under command of the local commander.

Again in Berlin, the issue of control and command of airlift resources raised its head. General LeMay, as USAFE commander, allowed Gen. Tunner direct communication with his Air Transport headquarters; his successor, General Canon, rescinded this. LeMay told Tunner he could communicate directly with Headquarters European Command or both Military Air Transport Service Headquarters directly when dealing with issues of Operation Vittles. (10:177) After Gen. Canon's arrival, Tunner's every request regarding airlift issues had to be staffed and sent through the USAFE Headquarters chain. This was unacceptable, for as Tunner so clearly stated, "...In air transport everything is different... rules, methods, attitudes, procedures, results... these are all different than combat operations." (15:160) Unity of command in air mobility is every bit as important as in any other military endeavor. The Royal Air Force recognized this perhaps better than our own Air Force. In October 1948, they merged operations with the USAF

and created the Combined Airlift Task Force (CALFT) under Gen. Tunner's command. With this., allied airlift efforts were centrally managed. (8:60)

During the Berlin operations, airlifters documented the need for a new piece of equipment that was not formalized before and that was a standardized mechanical on-loading and off-loading aid. (10:180) The rapid turn-around time required in Operation Vittles placed so much emphasis on the loading and unloading of the aircraft that, for the first time, this aspect of air transportation became the limiting factor for sortie success.

Other than unity of command and standardized flying procedures, what else did these two operations do to provide the bedrock for today's air mobility operations? Centralized maintenance by performing de-centralized tasks remains essential today. PLM proved scheduled maintenance is one of the most important planning aspects of any air operation, especially when considering large cargo aircraft that accumulate hours quickly. With the implementation of PLM, Gen. Tunner. was able to double aircraft availability.

. These two operations underscore the lack of glamour in successful airlift campaigns. In a successful airlift, airplanes belong in the air; when on the ground, they should be in the process of being loaded or unloaded with cargo, or having maintenance performed on them. Air crews and mechanics should either be flying, working on airplanes, or resting to fulfill those duties. There is no glamour, only results. (15:162)

Successful air mobility operation requires transportation experts, skill, courage, tenacity,, and organization. Specialized training is required as well as unique equipment. Air mobility is a mission and as such, requires, or rather demands, a sound air doctrine.

CHAPTER IV

CONCLUSIONS

Operations over the Hump and into Berlin provide the modern air leader with excellent examples of how to use mobility forces today. In the last year of operations over the Hump, there was one aircraft taking off every 2 1/4 minutes,- 24 hours a day. The flow of cargo had increased from 2,500 tons per month to more than 72,000 tons a month average in the final three months of the year. (15:129) The China-Burma-India airlift was the birthplace of modem strategic mobility operations. It incorporated all aspects of air power in a national transportation system, as well as flexibility and capability . As part of this national system, the Hump was only the air portion of a very long land and sea lift operation. (10:57)

Doctrinal growth of airlift was rapidly developed during World War II operations. In fact, in 1944, Army Air Force Regulation 20-44 was promulgated which stated in essence that miscellaneous transport units would be established, and the Air Transportation Corps would be the single inter-theater airlift service. (10:65) The concept of a single manager for airlift was germinating in the minds of doctrinal air leaders. By the same token, airlift per day in Berlin had increased from 700 tons per day to an average of more than 7,000 tons and aircraft were taking off and landing every 90 seconds. These numbers were possible because of air mobility, use of air power's greatest assets: speed, range, flexibility, and versatility. As spelled out in Volume I of Air Force Manual 1-1, air mobility is a force enhancement asset... -it multiplies combat effectiveness.

These airlift operations once again proved aerospace forces should be controlled by an airman, and as a corollary to that, mobility forces should be controlled by a mobility airman. As a role of air power, force enhancement such as the Berlin Airlift may be the major contribution

air forces make to a campaign. Unity of command is vital during air mobility operations. During operations over the Hump a muddled chain of command was replaced with a workable one from General Arnold directly to the airlift commander. (15:61) During Berlin operations it took direction from the Secretary of the Air Force Symington, but finally the airlift people worked for an airlift expert.

Airlift doctrine, thought out and proven during these two operations., is germane to today's air mobility taskings. Strategic airlift is a function of air power that supports the entire defense establishment,, not just the air component. Strategic airlift is a vital element of air power and the national military strategy. (10:73)

Airlift has some limitations: weather can still be a problem, support infrastructure at remote locations may be lacking, and airlift is vulnerable to ground and air attack. But a good strategic air plan will account for these limitations. Also, airlift is expensive, but if this nation wants global power it must be prepared to pay for global reach.

What, then, does this signify and what does it portend for the future? The bottom line is: With the right leadership, the right training, the right discipline and the right equipment, airlift doctrine is sound. The doctrine of the air mobility in 1995 is the doctrine that was tested and proven between 1942 and 1949. As Gen. Tunner said of the people of the Air Transport Command, 'They can deliver anything, anytime, anywhere." The same holds true today.


China
International boundary
Province-level boundary
National capital
Province-level capital
Railroad
Road
0 500 Kilometers
0 500 Miles
SOVIET UNION
MONGOLIA
XINJIANG
XIZANG
QINGHAI
GANSU
NEI MONGOL
HEILONGJIANG
JILIN
LIAONING
NORTH KOREA
SOUTH KOREA
SICHUAN
HUBEI
HENAN
HUNAN
GUANGDONG
GUANGXI
YUNNAN
FUJIAN
ZHEJIANG
JIANGSU
SHANDONG
SHANXI
HEBEI
NEPAL
INDIA
BHUTAN
BURMA
LAOS
VIETNAM
THAILAND
CAMBODIA
HAINAN
PHILIPPINES
Taiwan
TAIWAN
Luzon
South China Sea
East China Sea
Yellow Sea
Ulaanbaatar
Beijing
Pyongyang
Seoul
Tokyo
New Delhi
Kathmandu
Thimphu
Rangoon
Bangkok
Manila
Hanoi
Vientiane
Kunming
Lhasa
Urumqi
Kashi
Hong Kong (U.K.)
Macau (PORT.)

Figure 1


Germany
International boundary
State (Land) boundary
National capital
State (Land) capital
Railroad
Autobahn
Other road
DENMARK
SWEDEN
Copenhagen
Baltic Sea
North Sea
NETHERLANDS
BELGIUM
LUX.
Luxembourg
FRANCE
SWITZERLAND
AUSTRIA
POLAND
CZECH REPUBLIC
Prague
Berlin
Amsterdam
Brussels
SCHLESWIG-HOLSTEIN
HAMBURG
BREMEN
NIEDERSACHSEN
MECKLENBURG-VORPOMMERN
BRANDENBURG
SACHSEN-ANHALT
NORDRHEIN-WESTFALEN
HESSEN
THÜRINGEN
SACHSEN
RHEINLAND-PFALZ
SAARLAND
BAYERN
BADEN-WÜRTTEMBERG

Figure 2

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